

Docket No.: 005918 USA/FPS/MMCS/APC

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventive Application of

SHANMUGASUNDRAM et al.

Serial No. 09/943,955

Filed: August 31, 2001

For: **FEEDBACK CONTROL OF A CHEMICAL MECHANICAL POLISHING DEVICE
PROVIDING MANIPULATION OF REMOVAL RATE PROFILES**

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Honorable Commissioner for Patents
Washington, D.C. 20231

Sir:

In accordance with the provisions of 37 C.F.R. 1.56, 1.97 and 1.98, the attention of the Patent and Trademark Office is hereby directed to the documents listed on the attached form PTO-1449. It is respectfully requested that the documents be expressly considered during the prosecution of this application, and that the documents be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

This Information Disclosure Statement is being filed within three months of the U.S. filing date OR before the mailing date of a first Office Action on the merits. No certification or fee is required.

This submission does not constitute a representation that a search has been made or that no better art exists and does not constitute an admission or representation that any of the listed documents is material or constitutes prior art. If it should be determined that any of the listed documents does not constitute prior art under the United States law, Applicants reserve the right

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Serial No. 09/943,955

to present to the Office the relevant facts and law regarding the appropriate status of such document.

No certification or fee is believed to be required. However, the Commissioner is hereby authorized to charge any additional fees should any be required for this submission, or credit any overpayment to deposit account no. 08-0219.

Respectfully submitted,

HALE AND DORR LLP



Scott M. Alter

Registration No. 32,879

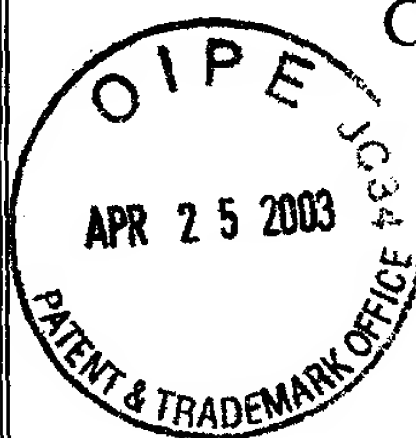
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ATTY. DOCKET NO.
005918
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U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	3,205,485	09/07/65	Noltingk			10/21/60
	3,229,198	01/11/66	Libby			09/28/62
	4,000,458	12/28/76	Miller et al.			08/21/75
	4,302,721	11/24/81	Urbanek et al.			05/15/79
	4,750,141	06/07/88	Judell et al.			11/26/85
	4,757,259	07/12/88	Charpentier			11/05/86
	4,938,600	07/03/90	Into			02/09/89
	5,283,141	02/01/94	Yoon et al.			03/05/92
	5,338,630	08/16/94	Yoon et al.			11/18/93
	5,485,082	01/16/96	Wisspeintner et al.			04/05/90
	5,497,381	03/05/96	O'Donoghue et al.			06/01/95
	5,511,005	04/23/96	Abbe et al.			02/16/94
	5,519,605	05/21/96	Cawlfeld			10/24/94
	5,526,293	06/11/96	Mozumder et al.			12/17/93
	5,541,510	06/30/96	Danielson			04/06/95
	5,546,312	08/13/96	Mozumder et al.			02/24/94
	5,553,195	09/03/96	Meijer			09/29/94
	5,602,492	02/11/97	Cresswell et al.			04/28/94
	5,617,023	04/01/97	Skalski			02/02/95
	5,627,083	05/06/97	Tounai			05/12/95
	5,642,296	06/24/97	Saxena			07/29/93
	5,646,870	07/08/97	Krivokapic et al.			02/13/95
	5,649,169	07/15/97	Berezin et al.			06/20/95
	5,654,903	08/05/97	Reitman et al.			11/07/95
	5,663,797	09/02/97	Sandhu			05/16/96
	5,665,199	09/09/97	Sahota et al.			06/23/95
	5,666,297	09/09/97	Britt et al.			05/13/94
EXAMINER	DATE CONSIDERED					

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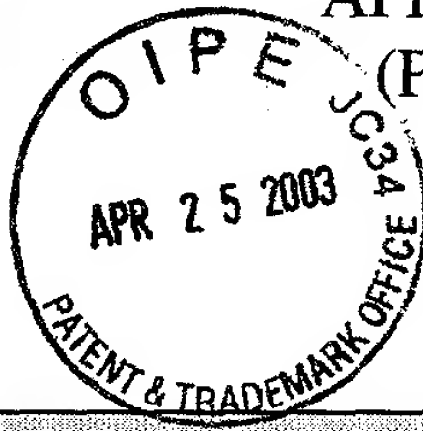
U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	5,667,424	09/16/97	Pan			09/25/96
	5,674,787	10/07/97	Zhao et al.			01/16/96
	5,719,796	02/17/98	Chen			12/04/95
	5,735,055	04/07/98	Hochbein et al.			04/23/96
	5,761,064	06/02/98	La et al.			10/06/95
	5,777,901	07/07/98	Berezin et al.			09/29/95
	5,787,021	07/28/98	Samaha			12/18/95
	5,787,269	07/28/98	Hyodo			09/19/95
	5,825,913	10/20/98	Rostami et al.			07/18/95
	5,857,258	01/12/99	Penzes et al.			05/12/94
	5,910,846	06/08/99	Sandhu			08/19/97
	5,943,237	08/24/99	Van Boxem			10/17/97
	5,960,185	09/28/99	Nguyen			06/24/96
	5,961,369	10/05/99	Bartels et al.			06/04/98
	5,978,751	11/02/99	Pence et al.			02/25/97
	6,017,771	01/25/00	Yang et al.			04/27/98
	6,036,349	03/14/00	Gombar			07/26/96
	6,064,759	05/16/00	Buckley et al.			11/06/97
	6,072,313	06/06/00	Li et al.			06/17/97
	6,097,887	08/01/00	Hardikar et al.			10/27/97
	6,108,092	08/22/00	Sandhu			06/08/99
	6,127,263	10/03/00	Parikh			07/10/98
	6,136,163	10/24/00	Cheung et al.			03/05/99
	6,141,660	10/31/00	Bach et al.			07/16/98
	6,143,646	11/07/00	Wetzel			06/03/97
	6,148,099	11/14/00	Lee et al.			07/03/97
	6,148,239	11/14/00	Funk et al.			12/12/97
EXAMINER	DATE CONSIDERED					

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U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	6,159,075	12/12/00	Zhang			10/13/99
	6,159,644	12/12/00	Satoh et al.			03/06/96
	6,161,054	12/12/00	Rosenthal et al.			09/17/98
	6,169,931	01/02/01	Runnels			06/29/98
	6,172,756	01/09/01	Chalmers et al.			12/11/98
	6,173,240	01/09/01	Sepulveda et al.			11/02/98
	6,191,864	02/20/01	Sandhu			02/29/00
	6,204,165	03/20/01	Ghoshal			06/24/99
	6,210,983	04/03/01	Atchison et al.			06/15/99
	6,214,734	04/10/01	Bothra et al.			11/20/98
	6,217,412	04/17/01	Campbell et al.			08/11/99
	6,222,936	04/24/01	Phan et al.			09/13/99
	2001/0001755	05/24/01	Sandhu et al.			12/29/00
	2001/0003084	06/07/01	Finarov			12/04/00
	6,246,972	06/12/01	Klimasauskas			05/27/99
	6,276,989	08/21/01	Campbell et al.			08/11/99
	6,280,289	08/28/01	Wiswesser et al.			11/02/98
	6,284,622	09/04/01	Campbell et al.			10/25/99
	6,287,879	09/11/01	Gonzales et al.			08/11/99
	6,290,572	09/18/01	Hofmann			03/23/00
	6,304,999	10/16/01	Toprac et al.			10/23/00
	2001/0030366	10/18/01	Nakano et al.			03/07/01
	6,307,628	10/23/01	Lu et al.			08/18/00
	6,314,379	11/06/01	Hu et al.			12/04/97
	2001/0039462	11/08/01	Mendez et al.			04/02/01
	6,320,655	11/20/01	Matsushita et al.			03/15/00

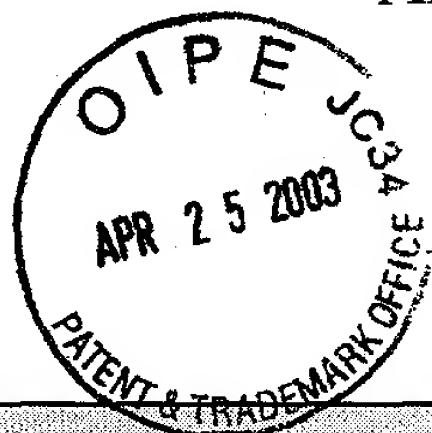
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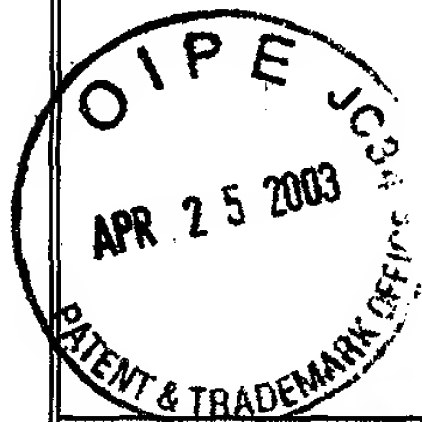
U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	2001/0042690	11/22/01	Talieh			12/14/00
	6,324,481	11/27/01	Atchison et al.			06/15/99
	6,334,807	01/01/02	Lebel et al.			04/30/99
	6,336,841	01/08/02	Chang			03/29/01
	2002/0032499	03/14/02	Wilson et al.			05/04/01
	6,360,133	03/19/02	Campbell et al.			06/17/99
	6,360,184	03/19/02	Jacquez			03/26/97
	6,368,883	04/09/02	Bode et al.			08/10/99
	6,368,884	04/09/02	Goodwin et al.			04/13/00
	6,379,980	04/30/02	Toprac			07/26/00
	6,388,253	05/14/02	Su			11/02/00
	2002/0058460	05/16/02	Lee et al.			09/14/01
	6,395,152	05/28/02	Wang			07/02/99
	6,397,114	05/28/02	Eryurek et al.			05/03/99
	6,405,096	06/11/02	Toprac et al.			08/10/99
	6,405,144	06/11/02	Toprac et al.			01/18/00
	2002/0070126	06/13/02	Sato et al.			09/19/01
	2002/0081951	06/27/02	Boyd et al.			02/20/02
	2002/0089676	07/11/02	Pecen et al.			04/26/00
	2002/0102853	08/01/02	Li et al.			12/20/01
	2002/0107599	08/08/02	Patel et al.			01/25/01
	6,435,952	08/20/02	Boyd et al.			06/30/00
	6,438,438	08/20/02	Takagi et al.			01/02/98
	2002/0113039	08/22/02	Mok et al.			02/16/01
	6,440,295	08/27/02	Wang			02/04/00
	2002/0127950	09/12/02	Hirose et al.			03/08/01
	6,455,937	09/24/02	Cunningham			03/17/99
EXAMINER	DATE CONSIDERED					

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U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	2002/0149359	10/17/02	Crouzen et al.			08/18/01
	6,479,902	11/12/02	Lopatin et al.			06/29/00
	6,479,990	11/12/02	Mednikov et al.			06/18/01
	2002/0185658	12/12/02	Inoue et al.			06/14/01
	2002/0193902	12/19/02	Shanmugasundram et al.			06/18/02
	2002/0197745	12/26/02	Shanmugasundram et al.			08/31/01
	2002/0197934	12/26/02	Paik			11/30/01
	2002/0199082	12/26/02	Shanmugasundram et al.			06/18/02
	6,503,839	01/07/03	Gonzales et al.			07/03/01
	2003/0020909	01/30/03	Adams et al.			04/09/01
	2003/0020928	01/30/03	Ritzdorf et al.			07/09/01
	6,517,413	02/11/03	Hu et al.			10/25/00

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FOREIGN PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	Translation	
						Yes	No
	61-66104	04/04/86	Japan			X	
	3-202710	09/04/91	Japan			X	
	8-23166	01/23/96	Japan			X	
	9-246547	09/19/97	Japan			X	
	WO 98/05066	02/05/98	WIPO			X	
	10-34522	02/10/98	Japan			X	
	0 869 652	10/07/98	Europe			X	
	WO 99/09371	02/25/99	WIPO			X	
	0 910 123	04/21/99	Europe			X	
	0 932 194	07/28/99	Europe			X	
	WO 00/00874	01/06/00	WIPO			X	
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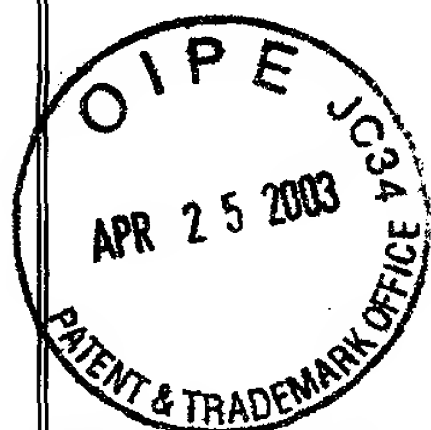
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						Yes	No
	1 071 128	01/24/01	Europe			X	
	WO 01/18623	03/15/01	WIPO			X	
	WO 01/25865	04/12/01	WIPO			X	
	434103	05/16/01	Taiwan			X	
	436383	05/28/01	Taiwan			X	
	455938	09/21/01	Taiwan			X	
	455976	09/21/01	Taiwan			X	
	2001-284299	10/12/01	Japan			X	
	2001-305108	10/31/01	Japan			X	
	2002-9030	01/11/02	Japan			X	
	WO 02/074491	09/26/02	WIPO			X	
	2002-343754	11/29/02	Japan			X	

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)

	Ostanin, Yu.Ya. October 1981. "Optimization of Thickness Inspection of Electrically Conductive Single-Layer Coatings with Laid-on Eddy-Current Transducers (Abstract)." <i>Defektoskopiya</i> , vol. 17, no. 10, pp. 45-52. Moscow, USSR.
	February 1984. "Substrate Screening Process." <i>IBM Technical Disclosure Bulletin</i> , pp. 4824-4825.
	Herrmann, D. 1988. "Temperature Errors and Ways of Elimination for Contactless Measurement of Shaft Vibrations (Abstract)." <i>Technisches Messen</i> TM , vol. 55, no. 1, pp. 27-30. West Germany.
	Lin, Kuang-Kuo and Costas J. Spanos. November 1990. "Statistical Equipment Modeling for VLSI Manufacturing: An Application for LPCVD." <i>IEEE Transactions on Semiconductor Manufacturing</i> , v. 3, n. 4, pp. 216-229.
	Chang, Norman H. and Costas J. Spanos. February 1991. "Continuous Equipment Diagnosis Using Evidence Integration: An LPCVD Application." <i>IEEE Transactions on Semiconductor Manufacturing</i> , v. 4, n. 1, pp. 43-51.
	Larrabee, G. B. May 1991. "The Intelligent Microelectronics Factory of the Future (Abstract)." <i>IEEE/SEMI International Semiconductor Manufacturing Science Symposium</i> , pp. 30-34. Burlingame, CA.
	Burke, Peter A. June 1991. "Semi-Empirical Modelling of SiO ₂ Chemical-Mechanical Polishing Planarization." <i>VMIC Conference, 1991 IEEE</i> , pp. 379-384. IEEE.
EXAMINER	DATE CONSIDERED

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<p align="center">INFORMATION DISCLOSURE CITATION IN AN APPLICATION (PTO-1449)</p> <p align="center">O I P E APR 25 2003 PATENT & TRADEMARK OFFICE</p>	<p>ATTY. DOCKET NO. 005918 USA/FPS/MMC/STAPC</p> <p align="center">RECEIVED JUL 24 2003 GROUP 1700</p>	<p>SERIAL NO. 09/943,955</p> <p align="center">RECEIVED APR 28 2003</p>
	<p>APPLICANT SHANMUGASUNDRAM et al. Technology Center 2100</p>	
	<p>FILING DATE August 31, 2001</p>	<p>GROUP 2122</p>
<p align="center">OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)</p>		
	<p>May 1992. "Laser Ablation Endpoint Detector." <i>IBM Technical Disclosure Bulletin</i>, pp. 333-334.</p>	
	<p>Spanos, Costas J., Hai-Fang Guo, Alan Miller, and Joanne Levine-Parrill. November 1992. "Real-Time Statistical Process Control Using Tool Data." <i>IEEE Transactions on Semiconductor Manufacturing</i>, v. 5, n. 4, pp. 308-318.</p>	
	<p>February 1993. "Electroless Plating Scheme to Hermetically Seal Copper Features." <i>IBM Technical Disclosure Bulletin</i>, pp. 405-406.</p>	
	<p>Scarr, J. M. and J. K. Zelisse. April 1993. "New Topology for Thickness Monitoring Eddy Current Sensors (Abstract)." <i>Proceedings of the 36th Annual Technical Conference</i>, Dallas, Texas.</p>	
	<p>Matsuyama, Akira and Jessi Niou. 1993. "A State-of-the-Art Automation System of an ASIC Wafer Fab in Japan." <i>IEEE/SEMI International Semiconductor Manufacturing Science Symposium</i>, pp. 42-47.</p>	
	<p>Yeh, C. Eugene, John C. Cheng, and Kwan Wong. 1993. "Implementation Challenges of a Feedback Control System for Wafer Fabrication." <i>IEEE/CHMT International Electronics Manufacturing Technology Symposium</i>, pp. 438-442.</p>	
	<p>Kurtzberg, Jerome M. and Menachem Levanoni. January 1994. "ABC: A Better Control for Manufacturing." <i>IBM Journal of Research and Development</i>, v. 38, n. 1, pp. 11-30.</p>	
	<p>Mozumder, Purnendu K. and Gabriel G. Barna. February 1994. "Statistical Feedback Control of a Plasma Etch Process." <i>IEEE Transactions on Semiconductor Manufacturing</i>, v. 7, n. 1, pp. 1-11.</p>	
	<p>Muller-Heinzerling, Thomas, Ulrich Neu, Hans Georg Nurnberg, and Wolfgang May. March 1994. "Recipe-Controlled Operation of Batch Processes with Batch X." <i>ATP Automatisierungstechnische Praxis</i>, vol. 36, no. 3, pp. 43-51.</p>	
	<p>Stoddard, K., P. Crouch, M. Kozicki, and K. Tsakalis. June-July 1994. "Application of Feedforward and Adaptive Feedback Control to Semiconductor Device Manufacturing (Abstract)." <i>Proceedings of 1994 American Control Conference - ACC '94</i>, vol. 1, pp. 892-896. Baltimore, Maryland.</p>	
	<p>Schaper, C. D., M. M. Moslehi, K. C. Saraswat, and T. Kailath. November 1994. "Modeling, Identification, and Control of Rapid Thermal Processing Systems (Abstract)." <i>Journal of the Electrochemical Society</i>, vol. 141, no. 11, pp. 3200-3209.</p>	
	<p>Tao, K. M., R. L. Kosut, M. Ekblad, and G. Aral. December 1994. "Feedforward Learning Applied to RTP of Semiconductor Wafers (Abstract)." <i>Proceedings of the 33rd IEEE Conference on Decision and Control</i>, vol. 1, pp. 67-72. Lake Buena Vista, Florida.</p>	
	<p>Hu, Albert, He Du, Steve Wong, Peter Renteln, and Emmanuel Sachs. 1994. "Application of Run by Run Controller to the Chemical-Mechanical Planarization Process." <i>IEEE/CPMT International Electronics Manufacturing Technology Symposium</i>, pp. 371-378.</p>	
	<p>Spanos, C. J., S. Leang, S.-Y. Ma, J. Thomson, B. Bombay, and X. Niu. May 1995. "A Multistep Supervisory Controller for Photolithographic Operations (Abstract)." <i>Proceedings of the Symposium on Process Control, Diagnostics, and Modeling in Semiconductor Manufacturing</i>, pp. 3-17.</p>	
	<p>Leang, Sovarong, Shang-Yi Ma, John Thomson, Bart John Bombay, and Costas J. Spanos. May 1996. "A Control System for Photolithographic Sequences." <i>IEEE Transactions on Semiconductor Manufacturing</i>, vol. 9, no. 2.</p>	
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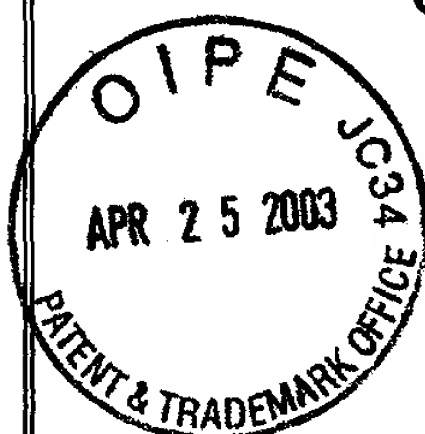
- | | |
|--|---|
| | Boning, Duane S., William P. Moyne, Taber H. Smith, James Moyne, Ronald Telfeyan, Arnon Hurwitz, Scott Shellman, and John Taylor. October 1996. "Run by Run Control of Chemical-Mechanical Polishing." <i>IEEE Transactions on Components, Packaging, and Manufacturing Technology—Part C</i> , vol. 19, no. 4, pp. 307-314. |
| | Zhe, Ning, J. R. Moyne, T. Smith, D. Boning, E. Del Castillo, Yeh Jinn-Yi, and Hurwitz. November 1996. "A Comparative Analysis of Run-to-Run Control Algorithms in Semiconductor Manufacturing Industry (Abstract)." <i>IEEE/SEMI 1996 Advanced Semiconductor Manufacturing Conference Workshop</i> , pp. 375-381. |
| | Yasuda, M., T. Osaka, and M. Ikeda. December 1996. "Feedforward Control of a Vibration Isolation System for Disturbance Suppression (Abstract)." <i>Proceeding of the 35th IEEE Conference on Decision and Control</i> , vol. 2, pp. 1229-1233. Kobe, Japan. |
| | Fan, Jr-Min, Ruey-Shan Guo, Shi-Chung Chang, and Kian-Huei Lee. 1996. "Abnormal Tred Detection of Sequence-Disordered Data Using EWMA Method." <i>IEEE/SEMI Advanced Semiconductor Manufacturing Conference</i> , pp. 169-174. |
| | Smith, Taber and Duane Boning. 1996. "A Self-Tuning EWMA Controller Utilizing Artificial Neural Network Function Approximation Techniques." <i>IEEE/CPMT International Electronics Manufacturing Technology Symposium</i> , pp. 355-363. |
| | Guo, Ruey-Shan, Li-Shia Huang, Argon Chen, and Jin-Jung Chen. October 1997. "A Cost-Effective Methodology for a Run-by-Run EWMA Controller." <i>6th International Symposium on Semiconductor Manufacturing</i> , pp. 61-64. |
| | Mullins, J. A., W. J. Campbell, and A. D. Stock. October 1997. "An Evaluation of Model Predictive Control in Run-to-Run Processing in Semiconductor Manufacturing (Abstract)." <i>Proceedings of the SPIE – The International Society for Optical Engineering Conference</i> , vol. 3213, pp. 182-189. |
| | Reitman, E. A., D. J. Friedman, and E. R. Lory. November 1997. "Pre-Production Results Demonstrating Multiple-System Models for Yield Analysis (Abstract)." <i>IEEE Transactions on Semiconductor Manufacturing</i> , vol. 10, no. 4, pp. 469-481. |
| | Durham, Jim and Myriam Roussel. 1997. "A Statistical Method for Correlating In-Line Defectivity to Probe Yield." <i>IEEE/SEMI Advanced Semiconductor Manufacturing Conference</i> , pp. 76-77. |
| | Shindo, Wataru, Eric H. Wang, Ram Akella, and Andrzej J. Strojwas. 1997. "Excursion Detection and Source Isolation in Defect Inspection and Classification." <i>2nd International Workshop on Statistical Metrology</i> , pp. 90-93. |
| | July 1998. "Active Controller: Utilizing Active Databases for Implementing Multistep Control of Semiconductor Manufacturing (Abstract)." <i>IEEE Transactions on Components, Packaging and Manufacturing Technology—Part C</i> , vol. 21, no. 3, pp. 217-224. |
| | Fang, S. J., A. Barda, T. Janecko, W. Little, D. Outley, G. Hempel, S. Joshi, B. Morrison, G. B. Shinn, and M. Birang. 1998. "Control of Dielectric Chemical Mechanical Polishing (CMP) Using and Interferometry Based Endpoint Sensor." <i>International Proceedings of the IEEE Interconnect Technology Conference</i> , pp. 76-78. |

EXAMINER

DATE CONSIDERED

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

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FILING DATE
August 31, 2001

GROUP
2122

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)

- Ouma, Dennis, Duane Boning, James Chung, Greg Shinn, Leif Olsen, and John Clark. 1998. "An Integrated Characterization and Modeling Methodology for CMP Dielectric Planarization." *Proceedings of the IEEE 1998 International Interconnect Technology Conference*, pp. 67-69.
- Boning, Duane S., Jerry Stefani, and Stephanie W. Butler. February 1999. "Statistical Methods for Semiconductor Manufacturing." *Encyclopedia of Electrical Engineering*, J. G. Webster, Ed.
- McIntosh, John. March 1999. "Using CD-SEM Metrology in the Manufacture of Semiconductors (Abstract)." *JOM*, vol. 51, no. 3, pp. 38-39.
- Pan, J. Tony, Ping Li, Kapila Wijekoon, Stan Tsai, and Fritz Redeker. May 1999. "Copper CMP Integration and Time Dependent Pattern Effect." *IEEE 1999 International Interconnect Technology Conference*, pp. 164-166.
- Meckl, P. H. and K. Umemoto. August 1999. "Achieving Fast Motions in Semiconductor Manufacturing Machinery (Abstract)." *Proceedings of the 1999 IEEE International Conference on Control Applications*, vol. 1, pp. 725-729. Kohala Coast, HI.
- Khan, K., C. El Chemali, J. Moyne, J. Chapple-Sokol, R. Nadeau, P. Smith, C., and T. Parikh. October 1999. "Yield Improvement at the Contact Process Through Run-to-Run Control (Abstract)." 24th *IEEE/CPMT Electronics Manufacturing Technology Symposium*, pp. 258-263.
- Ruegsegger, Steven, Aaron Wagner, James S. Freudenberg, and Dennis S. Grimard. November 1999. "Feedforward Control for Reduced Run-to-Run Variation in Microelectronics Manufacturing." *IEEE Transactions on Semiconductor Manufacturing*, vol. 12, no. 4.
- November 1999. "How to Use EWMA to Achieve SPC and EPC Control." *International Symposium on NDT Contribution to the Infrastructure Safety Systems*, Tores, Brazil.
<<http://www.ndt.net/abstract/ndtiss99/data/35.htm>>
- Edgar, T. F., W. J. Campbell, and C. Bode. December 1999. "Model-Based Control in Microelectronics Manufacturing." *Proceedings of the 38th IEEE Conference on Decision and Control*, Phoenix, Arizona, vol. 4, pp. 4185-4191.
- Meckl, P. H. and K. Umemoto. April 2000. "Achieving Fast Motions by Using Shaped Reference Inputs [Semiconductor Manufacturing Machine] (Abstract)." *NEC Research and Development*, vol. 41, no. 2, pp. 232-237.
- Oechsner, R., T. Tschaftary, S. Sommer, L. Pfitzner, H. Ryssel, H. Gerath, C. Baier, and M. Hafner. September 2000. "Feed-forward Control for a Lithography/Etch Sequence (Abstract)." *Proceedings of the SPIE - The International Society for Optical Engineering Conference*, vol. 4182, pp. 31-39.
- Cheung, Robin. October 18, 2000. "Copper Interconnect Technology." *AVS/CMP User Group Meeting*, Santa Clara, CA.
- Edgar, Thomas F., Stephanie W. Butler, W. Jarrett Campbell, Carlos Pfeiffer, Christopher Bode, Sung Bo Hwang, K. S. Balakrishnan, and J. Hahn. November 2000. "Automatic Control in Microelectronics Manufacturing: Practices, Challenges, and Possibilities (Abstract)." *Automatica*, v. 36, n. 11.

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DATE CONSIDERED

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<p style="text-align: center;">OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)</p>		
	<p>Khan, S., M. Musavi, and H. Resson. November 2000. "Critical Dimension Control in Semiconductor Manufacturing (Abstract)." <i>ANNIE 2000. Smart Engineering Systems Design Conference</i>, pp. 995-1000. St. Louis, Missouri.</p>	
	<p>ACM Research Inc. 2000. "Advanced Copper Metallization for 0.13 to 0.05 μm & Beyond." http://acmrc.com/press/ACM-ECP-brochure.pdf</p>	
	<p>Ravid, Avi, Avner Sharon, Amit Weingarten, Vladimir Machavariani, and David Scheiner. 2000. "Copper CMP Planarity Control Using ITM." <i>IEEE/SEMI Advanced Semiconductor Manufacturing Conference</i>, pp. 437-443.</p>	
	<p>Chen, Argon and Ruey-Shan Guo. February 2001. "Age-Based Double EWMA Controller and Its Application to CMP Processes." <i>IEEE Transactions on Semiconductor Manufacturing</i>, vol. 14, no. 1, pp. 11-19.</p>	
	<p>Tobin, K. W., T. P. Karnowski, L. F. Arrowood, and F. Lakhani. April 2001. "Field Test Results of an Automated Image Retrieval System (Abstract)." <i>Advanced Semiconductor Manufacturing Conference, 2001 IEEE/SEMI</i>, Munich, Germany.</p>	
	<p>Tan, K. K., H. F. Dou, and K. Z. Tang. May-June 2001. "Precision Motion Control System for Ultra-Precision Semiconductor and Electronic Components Manufacturing (Abstract)." <i>51st Electronic Components and Technology Conference 2001. Proceedings</i>, pp. 1372-1379. Orlando, Florida.</p>	
	<p>Heuberger, U. September 2001. "Coating Thickness Measurement with Dual-Function Eddy-Current & Magnetic Inductance Instrument (Abstract)." <i>Galvanotechnik</i>, vol. 92, no. 9, pp. 2354-2366+IV.</p>	
	<p>Wang, LiRen and Hefin Rowlands. 2001. "A Novel NN-Fuzzy-SPC Feedback Control System." <i>8th IEEE International Conference on Emerging Technologies and Factory Automation</i>, pp. 417-423.</p>	
	<p>Moyne, J., V. Solakhian, A. Yershov, M. Anderson, and D. Mockler-Hebert. April-May 2002. "Development and Deployment of a Multi-Component Advanced Process Control System for an Epitaxy Tool (Abstract)." <i>2002 IEEE Advanced Semiconductor Manufacturing Conference and Workshop</i>, pp. 125-130.</p>	
	<p>Sarfaty, M., A. Shanmugasundram, A. Schwarm, J. Paik, Jimin Zhang, Rong Pan, M. J. Seamons, H. Li, R. Hung, and S. Parikh. April-May 2002. "Advance Process Control Solutions for Semiconductor Manufacturing (Abstract)." <i>13th Annual IEEE/SEMI Advanced Semiconductor Manufacturing Conference. Advancing the Science and Technology of Semiconductor Manufacturing. ASMC 2002</i>, pp. 101-106. Boston, MA.</p>	
	<p>Campbell, W. J., S. K. Firth, A. J. Toprac, and T. F. Edgar. May 2002. "A Comparison of Run-to-Run Control Algorithms (Abstract)." <i>Proceedings of 2002 American Control Conference</i>, vol. 3, pp. 2150-2155.</p>	
	<p>Good, Richard and S. Joe Qin. May 2002. "Stability Analysis of Double EWMA Run-to-Run Control with Metrology Delay." <i>IEEE/CPMT International Electronics Manufacturing Technology Symposium</i>, pp. 355-363.</p>	
<p>EXAMINER</p>	<p>DATE CONSIDERED</p>	

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FILING DATE
August 31, 2001

GROUP
2122

OTHER ART (Including Author, Title, Date, Pertinent Pages, Etc.)

- | | |
|--|--|
| | Smith, Stewart, Anthony J. Walton, Alan W. S. Ross, Georg K. H. Bodammer, and J. T. M. Stevenson. May 2002. "Evaluation of Sheet Resistance and Electrical Linewidth Measurement Techniques for Copper Damascene Interconnect." <i>IEEE Transactions on Semiconductor Manufacturing</i> , vol. 15, no. 2, pp. 214-222. |
| | Itabashi, Takeyuki, Hiroshi Nakano, and Haruo Akahoshi. June 2002. "Electroless Deposited CoWB for Copper Diffusion Barrier Metal." <i>IEEE International Interconnect Technology Conference</i> , pp. 285-287. |
| | ACM Research, Inc. 2002. "ACM Ultra ECP® System: Electro-Copper Plating (ECP) Deposition." www.acmrc.com/ecp.html |
| | Applied Materials, Inc. 2002. "Applied Materials: Information for Everyone: Copper Electrochemical Plating." www.appliedmaterials.com/products/copper_electrochemical_plating.html . |
| | KLA-Tencor Corporation. 2002. "KLA Tencor: Press Release: KLA-Tencor Introduces First Production-Worthy Copper CMP In-Situ Film Thickness and End-point Control System: Multi-Million Dollar Order Shipped to Major CMP Tool Manufacturer." www.kla-tencor.com/news_events/press_releases/press_releases2001/984086002.html . |
| | Takahashi, Shingo, Kaori Tai, Hiizu Ohtorii, Naoki Komai, Yuji Segawa, Hiroshi Horikoshi, Zenya Yasuda, Hiroshi Yamada, Masao Ishihara, and Takeshi Nogami. 2002. "Fragile Porous Low-k/Copper Integration by Using Electro-Chemical Polishing." <i>2002 Symposium on VLSI Technology Digest of Technical Papers</i> , pp. 32-33. |
| | Cunningham, James A. 2003. "Using Electrochemistry to Improve Copper Interconnects." < http://www.e-insite.net/semiconductor/index.asp?layout=article&articleid=CA47465 > |
| | March 25, 2003. International Search Report for PCT/US02/24859 prepared by the European Patent Office. |
| | Adams, Bret W., Bogdan Swedek, Rajeev Bajaj, Fritz Redeker, Manush Birang, and Gregory Amico. "Full-Wafer Endpoint Detection Improves Process Control in Copper CMP." <i>Semiconductor Fabtech</i> - 12 th Edition. Applied Materials, Inc., Santa Clara, CA. |
| | Berman, Mike, Thomas Bibby, and Alan Smith. "Review of In Situ & In-line Detection for CMP Applications." <i>Semiconductor Fabtech</i> , 8 th Edition, pp. 267-274. |
| | "Semiconductor Manufacturing: An Overview." < http://users.ece.gatech.edu/~gmay/overview.html > |
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